

# **EXHIBIT 11**

## **Expert Report of Dr. Steven W. Smith**

March 11, 2006

I have been retained by the Plaintiffs in the matter of *Vargas, et. al. v. Pfizer, Inc., et. al.*, case number 04 CV 9772 (WHP), currently before the United States District Court for the Southern District of New York, to render an opinion as to whether or not Defendants' musical sequence entitled *Aparthenonia* is a digitally edited and/or manipulated copy of the Plaintiffs' musical sequence entitled *Bust Dat Groove Without Ride* (referred to as "Funky Drummer").

### **My Background**

I have been a practicing scientist and engineer for approximately 20 years. I received a B.S. in Physics in 1983, an M.S. in Physics Instrumentation in 1984, and a Ph.D. in Electrical Engineering in 1988, all from the University of Utah. Since graduation most of my career has been spent inventing and directing the development of new instrumentation systems. Many of these have been high-end x-ray systems for industrial, security, and medical applications. All of my work has been extensively based on Digital Signal Processing. Since 1998 I have been the president of Spectrum San Diego, Inc., a research and development organization.

During my Ph.D. program I specialized in Digital Signal Processing and subsequently wrote a book on this topic, *The Scientist and Engineer's Guide to Digital Signal Processing*. This book is also sold in paper back under the name, *Digital Signal Processing: A Practical Guide for Engineers and Scientists*. About one-half of the 600+ pages in this book are related to frequency domain techniques, such as frequency spectra, the Fourier Transform, and Fast Fourier Transform methods. Since its publication in 1998, my book, for the most part, has been the best-selling Digital Signal Processing book on Amazon.com.

I have served as an expert witness on one previous occasion, from 1999 to 2002, in the matter of *Medical Instrumentation and Diagnostics Corporation v. Elekta Instruments*. This was a patent infringement suit involving medical imaging during brain surgery.

### **Requested Opinions**

It is my understanding that *Vargas v. Pfizer* is a copyright infringement case. It is also my understanding that the Plaintiffs claim that *Aparthenonia* is a digitally edited and/or manipulated copy of *Funky Drummer*. I have reviewed a report prepared by Dr. Richard Boulanger in which Dr. Boulanger uses various spectral analysis techniques to compare *Aparthenonia* to *Funky Drummer*. Dr. Boulanger concludes that the frequency spectra of *Aparthenonia* and *Funky Drummer* are different, and therefore, one is not a copy of the other.

I have been asked to render an opinion on the methodology and conclusions contained in Dr. Boulanger's report.

### **Materials Reviewed**

I have reviewed the following material:

1. Declaration of Ivan A. Rodriguez and accompanying compact discs
2. Declaration of Matthew Ritter
3. Declaration of Anthony Ricigliano

4. Declaration of Rhys Moody
5. Expert Report of Dr. Richard Boulanger
6. Second Amended Complaint in this matter
7. Judge Pauley's decision denying Defendants' motion for summary judgment.

### **Evaluation of Dr. Boulanger's Methods and Conclusions**

Both *Aparthenonia* and *Funky Drummer* are formed by repeating one bar, a 2.3 second pattern, over and over. Dr. Boulanger isolates one bar from *Aparthenonia* and one bar from *Funky Drummer* for comparison. In his Figure 24, Dr. Boulanger shows the waveforms for these two bars, which I have copied by optical scanning and present in Figure 1 of this report. In Figure 1 I have added my own notation to the individual drum-strokes so that I can refer to them in my analysis. The *Aparthenonia* drum-strokes are labeled as "AP1-AP12" and the *Funky Drummer* drum-strokes are labeled as "FD1-FD12."

The waveforms in Figure 1 have many similar and dissimilar features. For instance, the drum-strokes of AP11 and FD11 appear to match, while AP2 and FD2 do not. The Plaintiffs claim that this dissimilarity is a result of digital editing/manipulation. That is, during copying, the individual drum-strokes of *Funky Drummer* have been moved around by manipulating them with a computer audio editing program in order to create *Aparthenonia*.

The Defendants claim that the two waveforms are different because they have a different origin; i.e., one is not a copy of the other. Dr. Boulanger maintains that two waveforms can look similar even if they come from different instruments and different musicians. According to Dr. Boulanger, even though AP11 looks very much like FD11, it does not necessarily mean that one is a copy of the other.

However, according to Dr. Boulanger, comparing the frequency spectra of the two waveforms can provide a definitive answer. That is, if *Aparthenonia* is a copy of *Funky Drummer* then their frequency spectra will match. However, if *Aparthenonia* and *Funky Drummer* have different origins then their frequency spectra will not match. To answer this question Dr. Boulanger calculates the frequency spectra of the two waveforms in several different ways, which he presents in his Figures 1-36.

Up to this point I am in general agreement with the essence of Dr. Boulanger's statements. However, since I have no musical training I cannot render any opinion as to whether or not different musicians, with different instruments, playing at different points in time, can produce waveforms that look this similar. Nonetheless, I do agree that frequency spectra are a much more sensitive measure of the similarity of audio waveforms. In short, I agree that comparing the frequency spectra of *Aparthenonia* and *Funky Drummer* is an appropriate and powerful method of resolving the question at hand, i.e. if *Aparthenonia* is a digitally edited and/or manipulated copy of *Funky Drummer*.

However, the methods used by Dr. Boulanger to compare the frequency spectra of *Aparthenonia* and *Funky Drummer* have two fatal problems and he has reached exactly the wrong conclusions. These problems are described below.

### Comparing Apples with Oranges

It is obvious that the two waveforms in Figure 1 do not match in their entirety. For instance, AP2 does not match FD2, there is no match for AP3, and AP7 does not match FD7. In addition, the portion of the waveforms from 1.8 to 2.2 seconds (not shown in Figure 1 of this report, but shown in Figure 1 of Boulanger's report), are very dissimilar. This is not in dispute; the Plaintiffs have acknowledged these differences and have explained that these differences exist as a result of the digital editing and/or manipulation of *Funky Drummer* by Defendants. The question at hand is whether or not the individual drum-strokes in *Aparthenonia* are a copy of the individual drum-strokes in *Funky Drummer*, such as: AP4 vs FD4, AP6 vs FD6, AP11 vs FD11, and so on.

Dr. Boulanger seems unaware of this critical fact in conducting his analysis. Nowhere in his report does he take it into account or comment on its implications. Even worse, he specifically ignores it in the analysis leading to his Figures 25 and 26. These figures show an "Enhanced Correlation Frequency Analysis," which is a mathematical procedure that changes the waveform into the kind of graph shown. The important point is that he has done the analysis with the entire 1-bar loops. The fact that his Figures 25 and 26 are different simply proves that the 1-bar loops, taken in their entirety, are different. By ignoring Plaintiffs' claim of digital editing/manipulation, Boulanger's Figures 25 and 26, and the 30 pages of raw numbers he presents with them, tell us nothing about the question at hand. Boulanger repeats this same error in preparing his Figures 12 and 13.

### Questionable Subjective Conclusions

Dr. Boulanger's general method is to present a graphic comparing data from the two music sources, and then make the statement "See, they do not match." In this regard his subjective conclusions on what constitutes a "match" are very questionable at best. For instance, the section of the waveforms he identifies as "beat 3" appears to be an apples-to-apples comparison of the individual waveforms, and therefore the frequency spectra of "beat 3" should be very similar. This is shown in his Figures 4, 19/20, and 33/34. Dr. Boulanger concludes that these do not match. To me they appear to match very well. There are many additional examples of this on a drum-strike by drum-strike comparison.

Taking this further, I have copied the curves from Boulanger's Figures 33 and 34 and displayed them in Figure 2 of this report. The frequency spectra of beat 3 from *Aparthenonia* is shown in the upper curve and of *Funky Drummer* in the lower curve. In preparing this graphic I have omitted portions of the spectra which correspond to very small signals (i.e., less than -20dB below the peak value), as these may be contaminated by random noise and not expected to match. I have drawn vertical lines on this graphic showing the features (peaks and valleys) that clearly match between the two curves, and labeled them with the numbers from 1-19. Likewise, the vertical dotted lines indicate three features that may not match, which I have labeled A, B, and C. I included these three mainly for completeness; they are very marginal cases and should be given little or no weight. Every clear and obvious feature contained in the *Aparthenonia* curve is also contained in the *Funky Drummer* curve. In my opinion these are an exceptional match.

It also seems Dr. Boulanger has taken little effort to correct for factors that would make similar spectra artificially appear dissimilar. For instance, matching the brightness/contrast in his Figures 1-11 and 15-22; comparing data on a like vertical scale, as he has not done in his Figures 25 and 26; and eliminating data contaminated by noise, as he has not done in his Figures 33 and 34.

All-in-all, when Dr. Boulanger concludes that there are no matches in the frequency spectra, my conclusion is that he didn't look very hard, because the matches are present and they are prominent.

### **My Analysis of Dr. Boulanger's Data**

#### Direct Copy versus Associated Copy

In order to analyze these data it is important to distinguish between what I will call a "Direct Copy" and an "Associated Copy." To explain this, consider the example where a drummer strikes a drum once per second for 26 consecutive drum-strokes. We record these sounds and label the 26 drum-strokes with the letters: A; B, C, ... Z. These 26 drum-strokes will be very similar to each other in both waveform and frequency spectra; however, it is reasonable to believe that no two of them will be exactly alike. These are what I called *Associated Copies*. Since the drum-strokes are made by the same drummer on the same drum instrument in rapid succession, it is reasonable to expect that Associated Copies will have very similar, but not identical frequency spectra.

Now extend this example by assuming that an electronic copy is made of the drum-strokes recording. We will label the 26 copied drum-strokes with the lower case letters: a,b,c,...z, which correspond to the drum-strokes in the original recording: A, B, C, ... Z, respectively. If we compare like drum-strokes, such as "A-a", "B-b", or "Z-z", we will find an identical match in both waveform and frequency spectra. The only difference would be from whatever degradation is introduced by the copying procedure, which we will assume is negligible. This is what I call a *Direct Copy*.

The next step is to allow for the possibility that the copied sequence, a,b,c ... z, can be digitally edited and/or manipulated. For instance, we might take the drum-strike on the front of the sequence and move it to the end. In other words, we change: a,b,c, ... z, into: b,c,d, ... z,a. In another case, we might take a single drum-strike from the copied sequence, such as "k", and duplicate it 26 times. This changes: a,b,c, ... z, into: k,k,k, ... k. The point is, this editing procedure destroys our ability to detect a Direct Copy. If we compare the first drum-strike in the original and the edited copy we are comparing "A-b" in our first example, and "A-k" in our second. In general, the "match" we could expect to find between any one drum-strike in the original sequence, and any one drum-strike in the edited copy sequence, is that of an Associated Copy. Only on rare occasions would random chance allow us to observe a Direct Copy when comparing the original drum-strokes recording to the edited copy of the drum-strokes recording.

#### Detailed Analysis of the Frequency Spectra

This analysis is started by examining two specific drum-strokes that appear in *Funky Drummer*, labeled as FD4 and FD12 in Figure 1. As I have defined it above, these are Associated Copies of each other. Therefore their frequency spectra should appear very similar, but not identical. Now consider a single drum-strike in *Aparthenonia*, AP12, which appears to the eye to match FD4 and FD12. The question is: If *Aparthenonia* is based on a digitally edited copy of *Funky Drummer*, how much would we expect AP12 to resemble FD4 and FD12? Even if Plaintiffs are exactly correct, there is no reason to expect that any Direct Copies will be present. At most, AP12, FD4 and FD12 will be Associated Copies of each other.

If the Plaintiffs are correct, AP12 should resemble FD4 and FD12, about as much as FD4 resembles FD12. If the Defendants are correct, one would expect that FD4 and FD12 would appear very similar, and AP12 would appear significantly different. This sets the stage for the simple test I have prepared in Figure 3. In this graphic I have placed the frequency spectra for FD4, FD12, and

AP12 side-by-side for comparison. However, I have intentionally placed them in random order and without labels. The goal of this blind test is to determine if a human observer can determine which of these three spectra is different from the other two. After giving this test to several people it is clear that this cannot be done. In fact, if forced to choose which of the three spectra is different, all of the subjects I used chose the wrong one.

These results are extremely strong evidence in favor of the Plaintiffs' assertion that *Aparthenonia* is based on a digitally edited and/or manipulated copy of *Funky Drummer*. In order for Defendants' position to be correct (i.e., that *Aparthenonia* was created independently of *Funky Drummer*), it would mean that a different drummer, using different instruments, and at a different point in time, produced drum-strikes that are indistinguishable from the successive drum-strokes in *Funky Drummer*.

### Conclusions

The primary opinion I have been asked to provide is whether or not *Aparthenonia* is a digitally edited and/or manipulated copy of *Funky Drummer*. My analysis of this is based almost solely on the data provided in Dr. Boulanger's report. Dr. Boulanger concludes that the frequency spectra data provide evidence that *Aparthenonia* is not a copy of *Funky Drummer*. I strongly disagree; the methods and analysis conducted by Dr. Boulanger to reach his conclusions are fatally flawed. I have found nothing in these data to support his conclusion. On the contrary, based on my data analysis shown in Figures 2 and 3, plus taking all the presented data as a whole, I find the evidence extremely strong that *Aparthenonia* is a digitally edited and/or manipulated copy of *Funky Drummer*.



Steven W. Smith, Ph.D.

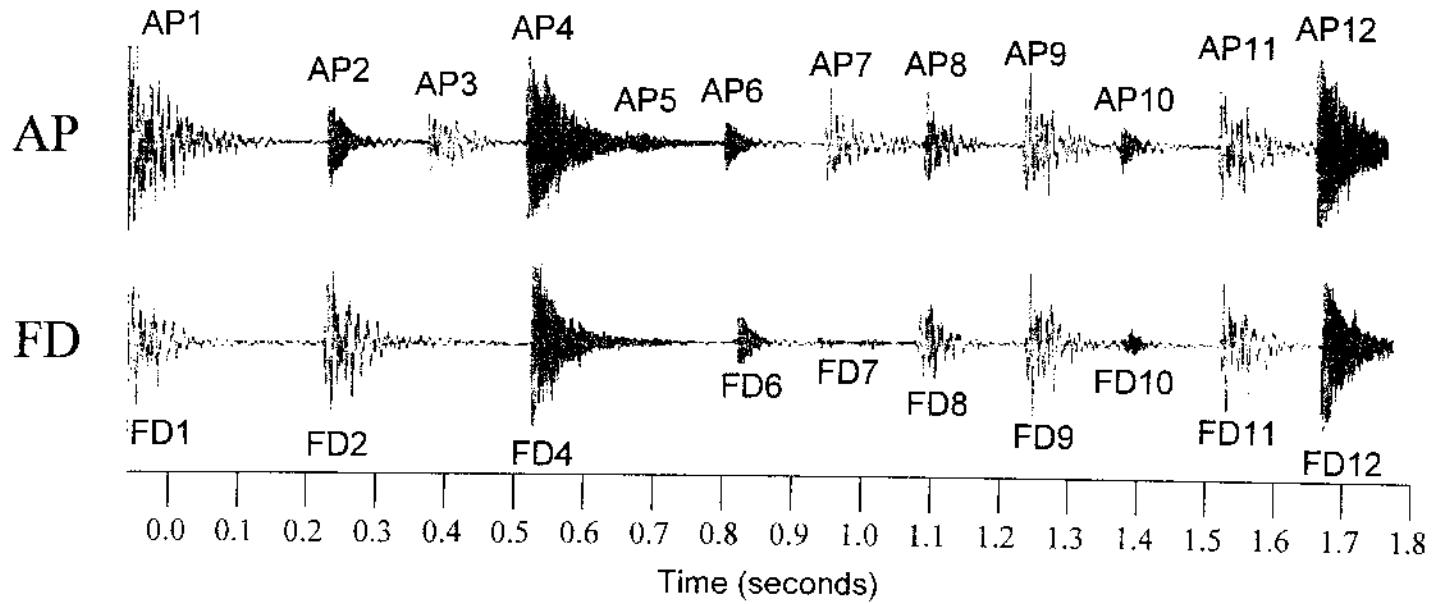


Figure 1. Waveforms of *Aparthenonia* and *Funky Drummer*, taken from Boulanger Fig. 24. The notation by each drum-strike (AP1-AP12, FD1-FD12) has been added by Smith.

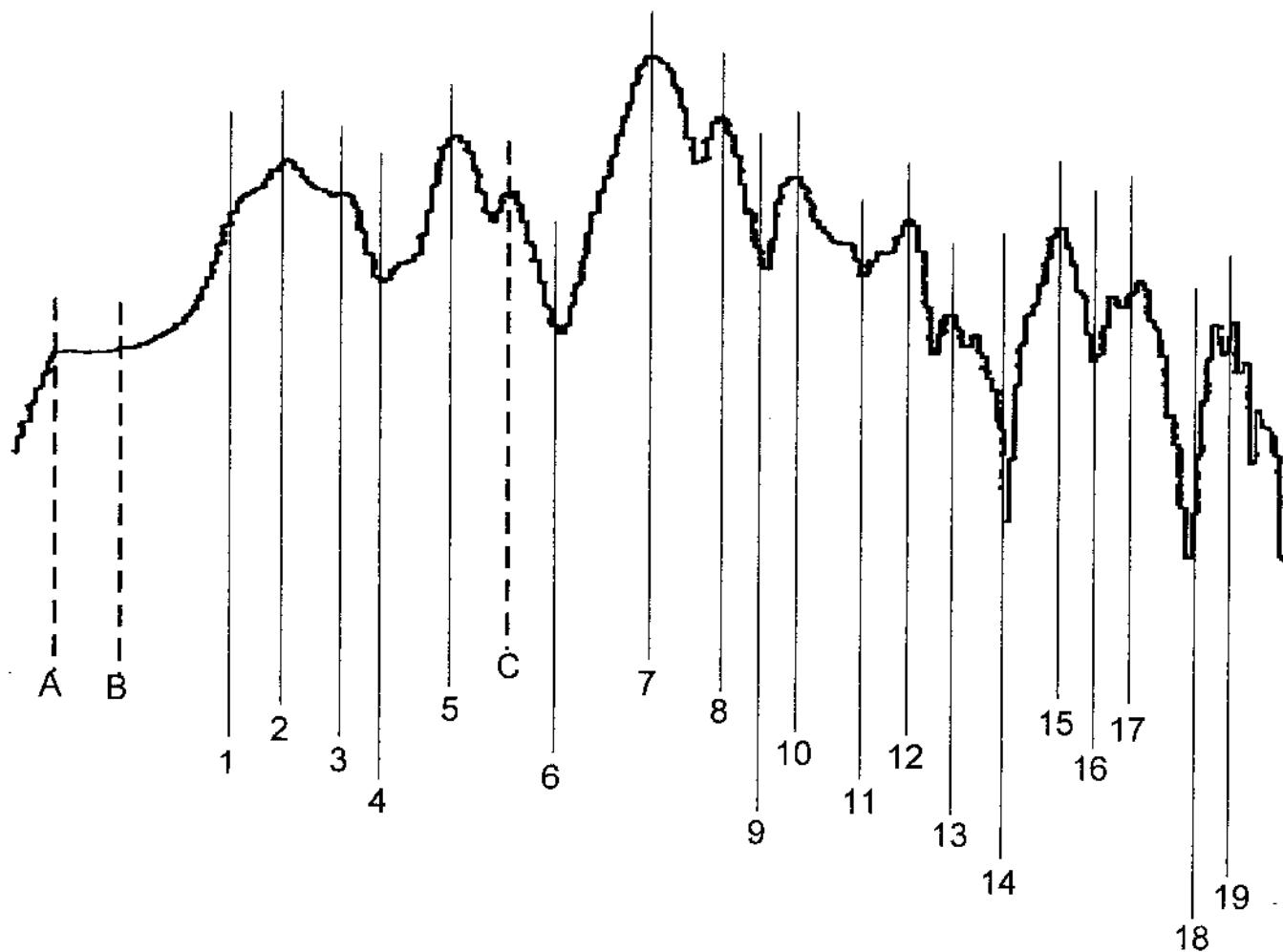


Figure 2. Frequency analysis of *Aparthenonia* (upper) and *Funky Drummer* (lower) taken from Boulanger Figures 33 and 34, respectively. The numbers indicate matches between the peaks and valleys of the two spectra, while the letters indicate possible features that do not match.

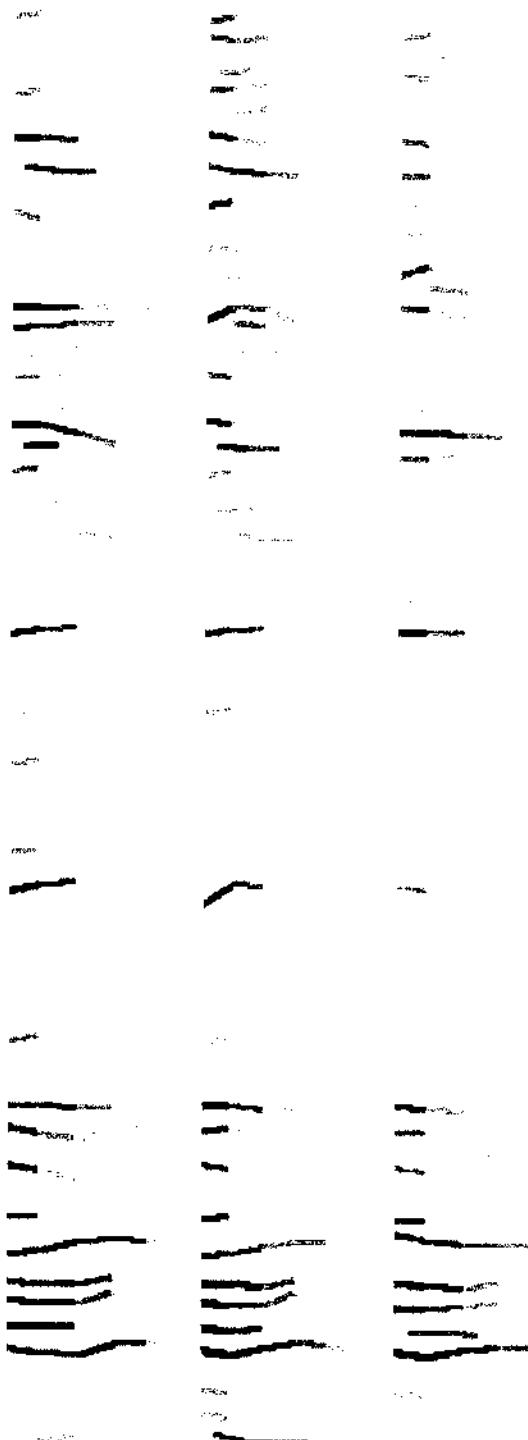


Figure 3. Sonogram of FD4, FD12 and AP12, taken from Boulanger Figures 18, 22, and 21, respectively. These three sonograms are presented in random order with no labeling to demonstrate that AP12 is as similar to FD4/FD12, as FD4 is to FD12.